

CLAIMS

1. A composite plastics composition comprising a particulate crosslinked polymer dispersed within a thermoplastic matrix, wherein:
- (a) the composite plastics composition comprises 10 to 45 weight percent of the crosslinked polymer, based on the weight of the composite plastics composition, and the crosslinked polymer has a particle size substantially from 0.2 to 1.2 millimeters;
- (b) the crosslinked polymer comprises 0.1 to 15 weight percent inert filler and 0.1 to 20 weight percent crosslinker, based on the total weight of crosslinked polymer; and
- (c) the crosslinked polymer is visually differentiable from the thermoplastic matrix.
2. A composite plastics composition according to claim 1 wherein the thermoplastic matrix comprises 50 to 100 weight percent poly(alkyl (meth)acrylate) and zero to 50 weight percent impact modifier, based on the weight of thermoplastic matrix.
3. A composite plastics composition according to claim 2 wherein the poly(alkyl (meth)acrylate) comprises a copolymer of 80 to 99 weight percent methyl methacrylate monomer units and 1 to 20 weight percent (C₁-C₁₀)alkyl acrylate monomer units, based on total weight of the poly(alkyl (meth)acrylate).
4. A composite plastics composition according to claim 2 or 3 wherein the impact modifier is a multi-stage

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sequentially-produced polymer comprising at least three stages in a sequence of a non-elastomeric first stage, an elastomeric second stage and a non-elastomeric third stage.

5. A composite plastics composition according to claim 4 wherein the multi-stage polymer is an emulsion polymer comprising monomer units of methyl methacrylate in the first stage, monomer units selected from one or more of butadiene, styrene and (C₁-C₈)alkyl acrylates in the second stage, and monomer units selected from one or more of (C₁-C₄)alkyl methacrylates, styrene and acrylonitrile in the third stage.

6. A composite plastics composition according to any one of the preceding claims wherein the crosslinked polymer comprises 90 to 99.5 weight percent monomer units selected from one or more of vinylaromatic monomer and (meth)acrylic monomer and 0.5 to 10 weight percent crosslinker, based on the weight of crosslinked polymer.

7. A composite plastics composition according to claim 6 wherein the (meth)acrylic monomer is selected from one or more of methyl methacrylate, methyl acrylate, ethyl acrylate, acrylic acid and butyl methacrylate.

8. A composite plastics composition according to any one of the preceding claims wherein the crosslinker is selected from one or more of allyl methacrylate, ethylene glycol dimethacrylate and divinylbenzene.

9. A composite plastics composition according to any one of the preceding claims wherein the inert filler is

selected from one or more of titanium dioxide, iron oxide, alumina, pigments, carbon black and silica.

10. A composite plastics composition according to any one of the preceding claims wherein the particle size of the crosslinked polymer is substantially from 0.3 to 1.2 millimeters.

11. A composite plastics composition comprising a particulate crosslinked polymer dispersed within a thermoplastic matrix, wherein:

(a) the composite plastics composition comprises more than 20 and up to 40 weight percent of the crosslinked polymer, based on the weight of the composite plastics composition, and the particle size of the crosslinked polymer is substantially from 0.3 to 1.2 millimeters;

(b) the crosslinked polymer comprises (i) from 95 to 99.5 weight percent (meth)acrylic monomer units selected from one or more of methyl methacrylate, ethyl acrylate and acrylic acid; (ii) from 0.5 to 5 weight percent crosslinker units selected from one or more of allyl methacrylate, ethylene glycol dimethacrylate and divinylbenzene; and (iii) from 0.3 to 5 weight percent inert filler selected from one or more of titanium dioxide, iron oxide, alumina, carbon black and silica, based on the total weight of crosslinked polymer;

(c) the thermoplastic matrix comprises (i) 50 to 60 weight percent poly(alkyl (meth)acrylate) comprising a copolymer of 80 to 99 weight percent methyl methacrylate monomer units and 1 to 20 weight percent

(C₁-C₁₀)alkyl acrylate monomer units, based on the weight of poly(alkyl (meth)acrylate); and (ii) 40 to 50 weight percent impact modifier comprising a multi-stage sequentially produced polymer, based on the weight of thermoplastic matrix; and

(d) the crosslinked polymer is visually differentiable from the thermoplastic matrix.

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12. A process for preparing a composite plastics composition comprising:

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(a) preparing a crosslinked polymer comprising 0.1 to 15 weight percent inert filler and 0.1 to 20 weight percent crosslinker, based on the weight of crosslinked polymer;

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(b) comminuting the crosslinked polymer to particles having a particle size substantially from 0.2 to 1.2 millimeters;

(c) dispersing 10 to 45 weight percent of the particles of crosslinked polymer within 55 to 90 weight percent of a thermoplastic matrix by a heat processing treatment; and

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(d) recovering the composite plastics composition as a particulate material.

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13. A process according to claim 12 wherein the particles of step (b) have a particle size substantially from 0.3 to 1.2 millimeters.

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14. A process according to claim 12 or 13 wherein the heat processing treatment of step (c) is selected from one or more of extrusion blending, hot-melt kneading and hot-melt batch mixing.

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15. A composite plastics composition prepared by the process claimed in any one of claims 12 to 14.

16. A process for preparing a simulated mineral article comprising forming, with heat treatment of a composite plastics composition as claimed in any one of claims 1 to 11 into a sheet, laminated sheet or molded material.

10 17. A process according to claim 16 wherein the heat treatment is selected from the group consisting of melt extrusion, coextrusion, blow molding, sheet forming and thermoforming.

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18. An extruded sheet material resulting from extrusion of a composite plastics composition as claimed in any one of claims 1 to 11.

20 19. A thermoformed product of a composite plastics composition as claimed in any one of claims 1 to 11.

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